Mark IV+ to Mark VI Upgrade Project

2005 Frame 6B User Group Meeting

ExxonMobil Chemical
Baytown, TX

ExxonMobil Chemical

Project Abstract

- This project will replace the existing Mark IV control systems on 3 1988 vintage Frame 6B GTGs with new Mark VI control systems.
- The replacement will be executed during planned outages during the 2005-2006 maintenance season.

ExxonMobil Chemical

Case-for-action

- GE support for the Mark IV+ is expected to cease within the next few years.
- Although the control systems have been reliable, breakdowns and maintenance issues are expected to increase as the system ages.
- Troubleshooting during upsets takes longer because technical support is not readily available from GE.
- EM desire not to invest in training new in-house support technicians on an obsolete system
- EM desire to put all GE control systems in the plant on a common platform (new 7FA GTG Mark VI was commissioned in January w/ complete spare).

ExxonMobil Chemical

GE Scope of Supply

- Mark VI control systems.
- Operator interface (HMIs).
- 2 week EM Factory Acceptance Test (FAT).
- Field installation of the Mark VI network.
- Field dismantling and installation of control system hardware.
- Installation of 3 additional speed P/Us for electronic O/S.
- Commissioning and startup assistance.

ExxonMobil Chemical

Details

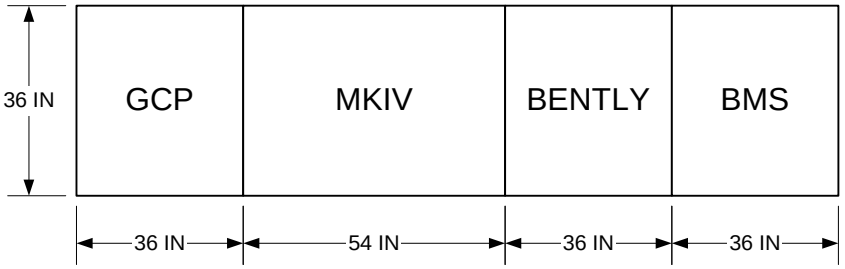
- The new Mark VI control systems will have the same card revisions as the 7FA Mark VI and spare control systems.
- The functionality and operation of the gas turbine will not change.
- B-N vibration probes will be wired directly to the MK VI.
- ExxonMobil to upgrade the B-N probes on the turbine to 3300 series prox and probes
- Site Operation Procedures will need to be revised to reflect the new control system.
- In order to allow the existing home run cables from being too short to reach the Mark VI terminal boards, the Mark VI panel will be custom built.

ExxonMobil Chemical

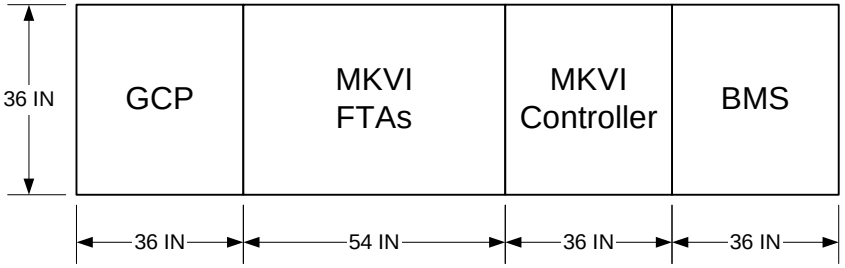
Panel Layout

The new MK VI panel will not fit in the same footprint of the existing MK IV panel. Therefore the existing skids will be modified to allow the installation of the MK VI

Existing Mark VI



New Mark VI



ExxonMobil Chemical

Overspeed Protection

- A <P> core (over-speed protection module) will be included.
- Three additional speed probes will be added to the turbine for a total of 6 speed pickups:
  - Three will be wired to the <P> core for over-speed protection
  - The other three will be wired to the <Q> core (control module) for speed control of the gas turbine.
- The over-speed bolt will be removed during the outage.

ExxonMobil Chemical

Execution

- A close liaison between GE and EM engineering will be maintained in order to ensure the detail engineering, installation and startup is smooth and correct.
- A FAT will be performed on the Mark VI. The FAT will include lessons learned from previous projects with GE.
- Marshalling termination rack will be used to pre-wire and test Mark VI terminations prior to each outage.
- The scope of the project will include dismantling and removal of the existing MK IV and B-N cabinets.
- Loop sheets will need to be updated to reflect the change in the control systems.
- Drawings will be created showing all Mark VI wiring from terminal strips to each field device.

ExxonMobil Chemical

Execution

- GE Factory Engineer to come out to site to install the Mark VI network prior to the first outage.
- Use the same GE controls T/A to install all 3 units.
- A one day testing period will be required during startup to test the TMR aspects of the Mark VI.

ExxonMobil Chemical

Schedule

- The units will be installed coincident with upcoming planned outages during the 2005-2006 maintenance season
- It is anticipated that each installation will take approximately 40 days to execute.

ExxonMobil Chemical